

Integrated Monitoring Protocol for Cave Entrance Communities and Cave Environments in the Klamath Network

Standard Operating Procedure #11: Invertebrates

Version 2017Feb10

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To create a new version of this SOP, carefully follow the instructions in SOP #18: Revising the Protocol (<https://irma.nps.gov/DataStore/Reference/Profile/2238840>). Use the Revision History Log below to describe the revisions:

- Populate the top table of the revision history log, providing the previous version date, author of the change, a specific but concise description of the changes made, the footnote number associated with change details, and a new version date.
- In the bottom table, add a footnote and as much text as needed to describe in detail the reasons for and implications of the change.

Revision History Log

Previous Version Date	Author of Change	Changes Made	Footnote #	New Version Date

Footnote #	Detailed Reasons for and Implications of the Changes

1 Introduction

This Standard Operating Procedure (SOP) gives step-by-step instructions for implementing invertebrate bait stations. These procedures are based on recommendations specific to Lava Beds National Monument (LABE) and Oregon Caves National Monument and Preserve (ORCA) (Taylor and Krejca 2006; Hale 2007; Iskali 2008) and on monitoring protocols described by other entities (e.g., USFWS 2006; Helf et al. 2005).

2 Equipment and Maintenance

The following equipment is required for setting invertebrate bait stations:

- Dedicated and/or decontaminated caving equipment including: helmet with mounted light(s), backup lights, kneepads, gloves, and boots
- Cave zone maps (see site dossiers referenced in Appendix C: Examples of Cave Site Dossier Materials)
- Notebook
- Pencils
- Watch
- Flagging
- Compass
- Laser distance meter
- Random number generator phone app or manual method
- Spherical mesh tea steeping balls wired closed with aluminum or stainless steel wire
- Extra aluminum or stainless steel wire to temporarily mount tea balls to rocks
- Bait (creamy peanut butter without preservatives or sugar; added oils are acceptable)
- Nitrile gloves to smear bait onto tea ball
- Laminated cardboard squares or small plastic bags to rest beneath each bait station
- “Do Not Disturb” signs for bait stations in developed caves
- Plastic bags for carrying bait and trash

The following equipment is required for completing invertebrate surveys:

- Dedicated and/or decontaminated caving equipment including: helmet with mounted light(s), backup lights, kneepads, gloves, and boots
- Cave zone maps
- Cave Invertebrate Survey Field Data Sheet (see end of this SOP)
- Photo Data Sheet (available from SOP #14)
- Field guide—cave invertebrates. Guides to both parks are available at the end of this SOP:
 - *Invertebrate Photo Key: Lava Beds National Monument*
 - *Field Guide to the Common Invertebrates of Oregon Caves*
- Pencils
- Watch
- Compass
- Laser distance meter
- Measuring device for 1 square meter survey area
- Magnifying hand lens (i.e., Hastings triplet 10x or larger)
- Camera with macro lens and ring flash
- Forceps and/or paintbrush for gently moving invertebrates during photography
- Plastic bags for carrying bait and trash

The following equipment is required only if an invertebrate collection plan is in place:

- Forceps
- Paintbrush
- Eyedropper
- 2 oz large-mouth Nalgene bottle filled halfway with 95% ethanol

The following equipment is required to sterilize baited tea balls after each use:

- Bucket
- Hot water

3 Timing and Location of Invertebrate Surveys

Surveys will occur during even years throughout the summer months (May–August). Initially, technicians will divide the caves into entrance, middle, and deep zones for monitoring and create maps showing those zones. Once established, these zones boundaries are recorded in maps in the cave site dossiers, referenced in Appendix C.

Surveys are performed over 2 visits to each cave. The first visit is to set bait, and the second visit, 14 to 16 days later, is to record fauna and remove the bait stations. The time period of 14–16 days was decided based on accumulation curves developed from a pilot study in 2013. During these baiting and retrieval visits, other summer monitoring activities are also performed, including vegetation, scat and visible organic monitoring, and climate data logger downloads.

Table 11-1 provides a list of caves where invertebrates will be sampled. The goal is to perform inventories at approximately the same time each year in order to avoid detecting changes that are related to seasonality rather than actual population changes. Different invertebrate populations are likely to occur over the long sampling time frame, which goes from early to late summer. Monitoring should be completed in the same site order as previous years to minimize this difference in invertebrate occurrence.. Early July may be the ideal period, so surveys should be performed close to that time.

Table 11-1. Caves surveyed for invertebrates at Oregon Caves National Monument and Preserve and at Lava Beds National Monument.

Park	Sampling Frame	Cave Name
ORCA	NONRANDOM	OREGON CAVES
ORCA	RANDOM	BLIND LEADS CAVE
LABE	NONRANDOM	BIG PAINTED CAVE
LABE	NONRANDOM	CAIC
LABE	NONRANDOM	COIC
LABE	NONRANDOM	SKULL ICE CAVE
LABE	RANDOM	SKYL
LABE	RANDOM	FOCA
LABE	RANDOM	JURI
LABE	RANDOM	SYMB
LABE	RANDOM	YELL
LABE	RANDOM	JUPO
LABE	RANDOM	MERRILL ICE CAVE
LABE	RANDOM	NOBE
LABE	RANDOM	INDIAN WELL CAVE
LABE	RANDOM	BLUE GROTTA CAVE
LABE	RANDOM	PEAR
LABE	RANDOM	VALENTINE CAVE
LABE	RANDOM	CGCA

Table 11-1 (continued). Caves surveyed for invertebrates at Oregon Caves National Monument and Preserve and at Lava Beds National Monument.

Park	Sampling Frame	Cave Name
LABE	RANDOM	ANGL
LABE	RANDOM	JUNIPER – HERCULES LEG CAVE
LABE	RANDOM	INCA
LABE	RANDOM	LABYRINTH – LAVA BROOK CAVE
LABE	RANDOM	EMST
LABE	RANDOM	RALO
LABE	RANDOM	DECA
LABE	RANDOM	CRCA
LABE	RANDOM	HIMM
LABE	RANDOM	LOPI
LABE	RANDOM	SEAN
LABE	RANDOM	CRYSTAL ICE CAVE
LABE	RANDOM	ROCO
LABE	RANDOM	ICEB
LABE	RANDOM	THUNDERBOLT CAVE
LABE	RANDOM	SOUTH LABYRINTH CAVE
LABE	RANDOM	SPID

4 Conducting Invertebrate Surveys

During the initial visit each year, 3 bait stations will be placed in each zone except in the main cave at Oregon Caves, where 1 bait station will be placed in each zone to reduce bait station crowding around the tour trail with so many concurrent zones throughout the cave. All caves will remain open during surveys with the exception of Blind Leads Cave at Oregon Caves. Blind Leads should be closed during the 14–16 day invertebrate survey period, as this cave is small and unable to handle public visitation without major disturbance of the bait stations.

Each station will be baited with ½ teaspoon of peanut butter smeared through the mesh tea ball so that most of the bait is pushed to the inside of the metal mesh (see Figure 11-1). This method will increase the surface area of the bait but avoid removal by rodents. Tea balls will be wired shut and wired to a nearby rock to avoid removal of the bait station by rodents. Significant problems with bait theft by rodents occurred at Lava Beds during the initial years of this protocol's implementation. A small laminated cardboard square or small plastic bag will be placed under the tea ball to avoid leaving bait behind on the cave floor. Do not to drop crumbs of bait elsewhere; the objective is to keep the bait localized.



Figure 11-1. Invertebrate bait station installed on cave floor.

Bait stations will be placed randomly on the floor in each zone. To determine a location, first find a random start point within the zone. Do this by measuring the total length of the zone with a laser distance meter or estimating the total length of the zone from the cave map. Then use a phone app or manual process to find a random number between zero and the total zone length; this will be the distance technicians should travel to the starting point. From there, use a random number generator to obtain an azimuth between 0 and 359 degrees. Measure the distance from the start point to the cave wall or other prohibitive feature (i.e., edge of fragile mineralized floor removed from sampling frame) using a laser distance meter. Generate a random number between 0 and the measured distance, proceeding at the randomly generated azimuth for the randomly generated distance in order to place the bait station. If the randomly selected site lands on ice or water, move the bait station to the nearest adjacent rocks. If the site lands in an area of the zone covered by fragile cave features (i.e., cave coral or fern debris cone), move the bait station to the edge of the fragile area to avoid damaging features. If the site lands next to a wall, the survey area will extend up the wall. In caves advertised to the public, place a small sign indicating “Do Not Disturb; Invertebrate Monitoring In Progress” next to the bait station, and always place the bait stations away from trails or obvious paths of travel; reselect the random site if necessary. Record the locations on a cave map or in a notebook for reference in 14–16 days when returning to survey. Mark the bait stations with highly visible flagging if the bait is placed in an area where it will be difficult to relocate (i.e., large piles of breakdown).

Return to the bait stations 14–16 days after they have been set. Place a 1×1 m quadrat over and centered on the bait station and count all taxa observed in the quadrat, recording species to as low a taxonomic level as possible on the datasheet. Often, invertebrates will scatter upon shining light on the bait stations, so be prepared to act quickly. Record the substrate type, moisture level, and survey time for each station. Each survey should take between 2 and 10 person minutes, based on the complexity of the cave floor. Place the bait and cardboard square into the trash bag; gently free any

organisms that may be hanging on the bait card (particularly, examine the inside of the tea ball and the underside of the cardboard square). Be sure the trash bag is sealed and do not leave any bait in the cave, as this could cause an artificially dense community at that location. It is important to note incidental observations that may occur outside of timed bait station surveys. Often the most rare species, including predators and uncommon troglobites are seen while casually walking through the passage. Use the travel time between bait stations and during scat surveys to search for and record other incidental invertebrates. Upon return to the office, enter the data into the database following SOP #13: Data Entry. Clean and sterilize all tea balls for reuse with a hot water scrub and soak.

5 Photograph Key and Voucher Specimens

During the first few years of this protocol, photographs will be taken of the various invertebrates observed in the caves. Crews should take photographs showing invertebrates at various angles, both in hand (except grylloblattids) and in their natural environment. The camera should have a macro lens so field crews can zoom to unique features of the organism. These images will be used to create a photograph guide for future technicians; the current guides for each park (*Invertebrate Photo Key: Lava Beds National Monument*; *Field Guide to the Common Invertebrates of Oregon Caves*) are at the end of this SOP. The photo guide is not intended to identify every organism to species, but rather to show the most convenient and reasonable taxonomic level that can be distinguished in the field by a crew of nonspecialists. In many cases, the level may only be to order (e.g., spider, springtail, millipede). Depending on viewing opportunities for different species, and background with invertebrate identification, a searcher is considered competent to lead a field crew for invertebrate monitoring after having trained with another competent crew leader at 10–20 sites. In future years an invertebrate identification guide, including species verified by taxonomists and descriptions of similar species to provide a level of certainty, will improve this protocol.

Prior to implementing the protocol each year, each technician should review the photo guide so they can identify the fauna and can also determine if more photographs are needed. Photographs should be managed as described in SOP #14: Photograph Management. Images should be reviewed and identified by park staff. If park staff cannot identify the species, a specialist should be contacted. Once a species is identified, datasheets, databases, and the photograph key should be updated.

If a species is deemed to be a new record for a site, it should be collected in 95% ethanol ONLY if one of the team members present has the authority to make collections. Use forceps, a paintbrush, and/or an eyedropper to handle the specimen as delicately as possible to avoid breaking off antennae or legs. Because most of the monitored caves (with the exception of The Cave) have been visited infrequently by invertebrate biologists, and the detectability of cave organisms is extremely low, the researchers performing this SOP might record new localities, range extensions, or new species. For this reason the team should be prepared to make collections that can later be sent to taxonomic specialists for identification. The name and address of appropriate taxonomic specialists changes over time, and the team member with a collection permit is responsible for identifying the appropriate person to send the specimen to and the appropriate location for long-term housing of the material.

6 Literature Cited

- Hale, E. 2007. ORCA biological survey guidelines. National Park Service Unpublished Protocol in Oregon Caves National Monument and Preserve files, dated 19 January 2007.
- Helf, K. L., R. L. Woodman, and B. J. Moore. 2005. Cave beetle (*Neaphaenops tekklampfi*) monitoring protocol for Mammoth Cave National Park, Kentucky. National Park Service report prepared for Mammoth Cave, National Park Service, U.S. Department of the Interior, Version 2.00 (15 December 2005).
- Iskali, G. 2008. Oregon Caves National Monument, biomonitoring 2007 year end report. Oregon Caves National Monument and Preserve Unpublished Report, dated 25 January 2008.
- Taylor, S. J., and J. K. Krejca. 2006. A biological assessment of caves in Lava Beds National Monument. Illinois Natural History Survey, Center for Biodiversity Technical Report 2006(6), prepared for Lava Beds National Monument, 20 April 2006.
- U.S. Fish and Wildlife Service (USFWS). 2006. USFWS Section 10(a) (1) (A) Scientific Permit Requirements for Conducting Presence/Absence Surveys for Endangered Karst Invertebrates in Central Texas. U.S. Fish and Wildlife Service, Austin, Texas.

7 Datasheet

(Pages 1 and 2)

Cave Invertebrate Survey Field Data Sheet Field Form SOP 11: Baited Invertebrate Quadrat Survey		
Cave Name:	Bait Type and Amount: 0.5 cm ³ Adam's Natural Peanut Butter	
Comments:	Date bait set:	Person(s) setting bait:
	Date bait retrieved:	Person(s) retrieving and surveying:

NOTE: To facilitate better quality data collection, please use the box tally method to record invertebrate abundance. One tally represents one invertebrate.

EXAMPLE:



Substrate type options/acronyms: Bedrock (**BR**), Breakdown (**BD**), Sediment (**S**), Pumice/Gravel (**P/G**)

Substrate moisture level during survey: Dry (**D**), Moist (**M**), Wet (**W**)

Y = Yes, present, N = No, not present

Zone	Station #	Start Time	Stop Time	Substrate Type	Substrate Moisture	Bait? (Y/N)	Mold/Fungus? (Y/N)	# Surveyors	Notes/Comments?
Entrance	1								
	2								
	3							1	
Middle	1								
	2								
	3								
Deep	1								
	2								
	3								

Species (Common Name)	Entrance			Middle			Deep		
	1	2	3	1	2	3	1	2	3
Ant									
Darkling beetle									
Rove beetle									
Bristletail									
Centipede									
Crane fly									
Camel Cricket-small									
Camel Cricket-large									
Dipluran									
Fly									
Gnat									
Grylloblatid									
Harvestman-sabacon									
Harvestman-Taracus									
Isopod									
Unknown larvae									
Midge									
Millipede-cave									
Millipede-surface									
Mite									
Spider									
Mosquito									
Moth									
Pseudoscorpion									
Silverfish									
Springtail-globular									
Springtail-white									
Springtail-silver									
Tissue moth									

8 Invertebrate Photo Key: Lava Beds National Monument

Invertebrate Photo Key Lava Beds National Monument

Glossary:

Cerci – (singular cercus) paired appendages that enhance sensory function

Forcipules – (singular forcipule) modified foreleg capable of injecting venom

Furcula – forked jumping organ or “springtail” that gets tucked into the abdomen segment when not being used to transport the springtail

Tenaculum – region in the abdomen where the furcula catches when tucked away

Klamath Network Inventory & Monitoring Program
Cave Entrance Communities and Cave Environment Monitoring

Cave Millipede

Plumatyla humerosa

Millipedes are slow moving and pale in coloration, making them easy to spot on the dark cave floors and walls. Millipedes have cylindrical bodies and two or more pairs of legs per body segment. They feed on decaying organic matter and are common throughout lava tube caves. Millipedes often curl into a tight spiral if they are feeling threatened.



Surface Millipede

Californiulus sp.

Surface millipedes are much larger than cave millipedes (~10 cm) and colored brown. They are troglomenes and often face an unfortunate ending if they venture too far into the cave.



Centipede

Order: Lithobiomorpha

With their flattened bodies and quick pace centipedes are effective cave predators and a rare find. They have long segmented bodies. Each segment supports one pair of legs. Most notably, centipedes have unique mouth parts that allow them to prey on other invertebrates. Attached to the back of their head are enlarged claws that adapted from the first pair of legs. These claws, called forcipules, inject venom into the prey. Careful not to confuse a centipede with a more commonly seen millipede.



Dipluran

Campodeidae

Haplocampa sp.

Diplurans resemble pale silverfish. They are named for their two “tails” or cerci that extend behind their abdomen and provide sensory functions. A Dipluran lacks compound eyes. They also have the ability to regenerate lost body parts over the course of several molts. The pale color and combination of cerci and antennae make the dipluran easily distinguishable as it crawls in and out of lava rock.



Dipluran

Japygidae

This japygid dipluran has not yet been documented in Lava Beds, but was found in caves on the Lassen National Forest in summer 2015. Note the difference in cerci between this and the campodeid dipluran.

Keep your eyes out; it's not an earwig!



Earwig

Dermaptera

Earwigs are not commonly found in Lava Beds caves; but could be confused with japygid diplurans, as they have similar cerci. This slide is to be used for comparison.



Symphylan

Class: Symphyla

At first glance, the symphylan might look like a dipluran, but this species has shorter antennae and does not have the two long cerci extending from its abdomen. Symphylans are much less common than diplurans, so consider yourself lucky if you find one!



Springtail

Tomocerus sp.

Small but abundant at 3-5 mm long, springtails cruise the cave and scavenge for decaying organic matter and soil fungus. Aptly named, they have a forked tail (furcula) that retracts into the abdomen catch (tenaculum). When the tenaculum is released, the furcula snaps down against the substrate and catapults the springtail into the air. They can travel many times their body length. The *Tomocerus sp.* is identified by their silver color.



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Springtail

Entomobrya sp.



Similar to the *Tomocerus sp.*, this species can spring into the air at a moment's notice and is often found grazing the substrate for organic goodies. The *Entomobrya sp.* seems to be found in entrance zones or zones not far below the surface. They are pale, football shaped, and smaller than the silver springtails. Most likely the species are a close adaptation other common *Entomobrya* found on the surface.



Springtail

unknown sp.

This super tiny sprintail species has not yet been identified, but was present in the middle zone of Hopkins Chocolate and [lower right photo metadata] in 2014.



Cave Cricket

Ceuthophilus sp.

Cave crickets are wingless (no chirping!), usually clear/tan/grey, their rounded back sometimes has a metallic rainbow sheen. They are content in cool dark places, making caves a delightful home. Species diversity is greater in western America. Sometimes referred to as a camel cricket. Not to be confused with black chirping field crickets.



Field Cricket

Field crickets are troglloxenes; their black bodies and wing presence distinguish them from cave crickets.

This is a placeholder...this slide could be further developed with better photos, etc.



Spider

perhaps: *Cybaeus sp.*

Found in normal to dry areas, especially in entrance and twilight zones. Webs are broad and flat across rock surfaces on the ceiling or floor. Very common in caves.



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Spider

Family: Nesticidae



Spider

unidentified species found
during 2014 invert surveys



Spider

unidentified species found
during 2014 invert surveys



Pseudoscorpion

Order: Pseudoscorpiones



The ultimate cave predator and a rare find. The pseudoscorpion is harmless to humans

Grylloblatid

Gurneyi kamp



Adult Female

Also known as the rock or ice crawler, the Grylloblatid prefers talus slopes, edges of snow fields, and lava tubes! They are extremely sensitive to heat. Just holding a Grylloblatid in your hand could kill it. They are both scavengers and predators. They have simple metamorphosis, meaning the larvae stage closely resembles the adult, just smaller and paler. Females are distinguished by an ovipositor located between the two cerci (circled in red).



Adult Female



Adult Male



Late Stage Larvae



Adult Male

Fungus Gnat

Family: Mycetophilidae



Fungus Gnat Larva

Family: Mycetophilidae

Frequently found in caves, fungus gnat larvae create a network of webs on the ceiling and walls to catch prey. Some species, such as those found in Waitomo Caves of New Zealand, display bioluminescence in their larval stage.

This specimen was found in the deep zone on the ceiling and walls covered in red paleosol.



Rove Beetle

Family: Staphylinidae

Elongated, slender, and quick, the Rove Beetle may be hiding under any rock in a soil environment. The beetle is reddish brown in color and has a flattened body. Its most distinguishing feature is the shortened, square elytra (hardened forewings). If spooked, it may flee the area with the tip of its abdomen bent upwards.

Fun Fact: they are positively thigmotactic, which means they like to be squished beneath things, like earwigs and cockroaches.



Beetle

unidentified family



Trichoniscid Isopod

Family: Trichoniscidae

Dorsoventrally flattened (squished top down), isopods are rare finds. Chances are increased if looking on wet surfaces with high relative humidity in the dark zone.



Mayfly

Order: *Ephemeroptera*

Scientifically named for the ephemeral lives of the adults. After the long larval stage and several cycles of molting the adult emerges and lives for one entire day, two at the most. This is because the mouthparts are vestigial and the mayflies to not uptake food as an adult. They are alive just long enough to mate. Unlike other insects, they continue to molt after reaching a winged stage. The final adult stage is called imagos.



Mite

Family: Rhagidiidae

Tiny, abundant, and diverse! Commonly seen with orange or red coloring on their one body segment. The single body segment makes them different from spiders who have two.



Flea

Order: Siphonaptera

Extraordinary parasites of mammals and birds. They are laterally flattened (squished left to right) to facilitate penetration of feathers and fur. They have small spines that help them maintain a fixed location. Larvae feed on organic matter provided by the host and the adults feed on the blood.



Bookline/Barklice

Order: Psocoptera

Commonly spotted eating lichen, mold, or fungi. They have true chewing mouth parts, which helps distinguish them from other. They also have long antennae.



Leafhopper

Family: Cicadellidae

True bugs! You won't offend an entomologist by calling them bugs. They have sucking beak-like mouthparts that are tucked under their chin when not in use. Leafhoppers can make a quick escape thanks to the cocked hind legs under their wings (?). They are incredibly diverse in North America.



Crane Fly

Family: Tipulidae

Often mistaken for a giant mosquito, the crane fly's size invokes a sense of fear some humans. However, they are completely harmless. Frequently crane flies have fewer than six legs because they shed them while under stress.



Thrip

Order: Thsanoptera

Thrips (both singular and plural). They are similar in size to a springtail. Generally found on flowers and fungi making use of their unique asymmetrical mouth parts. The left side has a mandible for punching or lancing the plant cells and the right sucks or vacuums the nutrients. Often their presences is discovered by the discoloration that forms on the leaf. Air enters the leaf and creates a silver tint. Their damage is minimal compared to the amount of pests they consume.

Similar size as a springtail



Silverfish

Order: Thysanura

Ever catch one of these at your local library? Silverfish feed on starches found in dried paste that bind books together. They can be spotted by their three "tails".



Bristletail

Order: Microcoryphia

Bristletails have three streaming "tails" and are generally found in damp areas. They are often compared with shrimp for having a "broke back" appearance.



Midge

Family: Chironomidae

Found mostly in guano/midden





Unknown\GODO_deep_20140701_KatrinaSmith
flies



Unknown\COIC_ent_20140625_KatrinaSmith_
flies



Unknown\COIC_ent_20140625_MeganMason
_flies



Unknown\GODO_ent_20140701_KatrinaSmith
_ant



Unknown\GODO_ent_20140701_KatrinaSmith
_invert

Cave Invertebrates

Not insects or bugs

Arthropods acceptable

References

Bugguide.net

Photos: Jean Krejca *Zara Environmental LLC*

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K. Krejca

Dipluran:

- <http://soilbugs.massey.ac.nz/diplura.php>
- Ferguson, L. Diplura of Lava Tube Caves
<http://www.vulcanospeleology.org/sym06/ISV6x42.pdf>



9 Field Guide to the Common Invertebrates of Oregon Caves

FIELD GUIDE TO THE COMMON INVERTEBRATES OF OREGON CAVES

VERSION 1.0

FEBRUARY 2011

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ANTS



BEELES



Family *Carabidae*
Carabid Beetle



Family *Leiodidae*
Round Fungus Beetle



Family *Scarabaeidae*
Scarab Beetle



Family *Staphylinidae*
Rove Beetle

BRISTLETAILS



Genus *Neomachilis*



Genus *Metriocampa*
Dipluran

CENTIPEDES



CRICKETS



Tropidischia xanthostoma
Camel Cricket (the big one!)



Genus *Pristoceuthophilus*
Cave Cricket (the small one)

GRYLLOBLATTIDS



Dark Grylloblattid



Orange Grylloblattid



Pale Grylloblattid

HARVESTMEN



Family *Sclerosomatidae*



Family *Sabaconidae*

MOTHS



Triphosa haesitata
Tissue Moth



Scoliopterix libatrix
Herald Moth

MILLIPEDES



Family *Caseyidae*
Yellow Millipede



Family *Conotylidae*
White Millipede (undescribed cave species)



Family *Nearctodesmidae*
Red Millipede



Family *Xystodesmidae*
Night Train

MITES



PSEUDOCENTIPEDES



PSEUDOSCORPIONS



SPRINGTAILS



Family *Entomobryidae*
Slender-Bodied Springtail



Family *Onychiuridae*
White Springtail



Family *Sminthuridae*
Globular Springtail

WORMS



Nemotode